



National Aeronautics and
Space Administration

SOLAR-B-PLAN-2006

Revision A

EFFECTIVE DATE: October 20, 2000

George C. Marshall Space Flight Center
Marshall Space Flight Center, Alabama 35812

SD21
SCIENCE DIRECTORATE

SOLAR-B

RISK MANAGEMENT PLAN

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MSFC - Form 454 (Rev. October 1992)

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RISK MANAGEMENT PLAN FOR SOLAR-B

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DOCUMENT HISTORY LOG

Status (Baseline/ Revision/ Canceled)	Document Revision	Effective Date	Description
Revision	A	10/20/2000	Requirements of MWI 7120.6 included in this revision. Added explicit discussion of safety to Section 4.2, Risk Analysis. Clarified identity of "Risk Owner." Identified schedule for Risk Management Panel meetings. Revised Impact Classifications for clarity.

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1 INTRODUCTION

1.1 Purpose

The purpose of the Solar-B Risk Management Plan (RMP) is to define: (a) Solar-B risk management responsibilities, (b) methodologies and processes to be used for Solar-B risk identification, assessment, abatement, tracking, and control; (c) criteria for categorizing or ranking risk according to probability and consequences; (d) role of risk management with respect to decision-making, formal reviews and status reporting; (e) documentation requirements for risk management products and actions. Risk management is best implemented and accomplished at the project level, and the intent of this plan is to help the project produce a quality product within programmatic, schedule and cost constraints. The RMP applies to internal and external risks for Solar-B development.

1.2 Project Description

Solar-B is a Japanese Institute of Space and Astronautical Sciences (ISAS) solar physics mission with invited United States (NASA) and United Kingdom (Particle Physics and Astronomy Research Council--PPARC) instrument and scientist participation. It utilizes one mid-size spacecraft placed in Sun-synchronous low Earth orbit to study the Sun. Solar-B is scheduled to launch in August 2004 from Kagoshima, Japan.

The primary objective for US participation in the Solar-B mission is the observation and understanding of the basic physical processes involved in the generation of the solar magnetic field, its transport and dissipation in the solar atmosphere, and in the methods by which the magnetic field modulates the Sun's luminosity. The objectives will be met by the acquisition and analysis of both spectral and imaging data from the visible, extreme ultraviolet (EUV), and soft x-ray wavelength bands. Special emphasis is placed on the relationship between phenomena observed in the visible spectrum (photosphere) to phenomena in the extreme ultraviolet and soft x-ray region (transition region and corona).

1.2.1 Science Instruments

Solar-B has three science instruments: 1) Solar Optical Telescope (SOT), including its associated Focal Plane Package (FPP), 2) Extreme-ultraviolet Imaging Spectrometer (EIS) and 3) the X-ray Telescope (XRT).

The objective of the Solar Optical Telescope (SOT) is to make continuous measurements of solar magnetic and velocity fields in the photosphere with an angular resolution of 0.2 arcsec (140 km), either by measuring the full line profile (Spectrograph) or by inferring the line profile from measurements at a few positions along the line (Filtergraph).

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The objective of the Extreme-ultraviolet Imaging Spectrometer is to measure spectral lines in two wavelength ranges that span plasma temperatures from 10^5 to 2×10^7 K. The observations will provide measurements of flow velocities as low as 10 km s^{-1} from the transition region to the corona.

The objective of the X-ray Telescope is to provide full Sun coronal images with twice the resolution of Yohkoh of the highest temperature coronal material, from 1×10^6 to 1×10^7 K.

1.2.2 Responsibilities

The following is an overview of Solar-B international responsibilities.

Japan	<ul style="list-style-type: none"> - Overall mission management - Launch vehicle; spacecraft; 0.5m Solar Optical Telescope (SOT) - Overall spacecraft integration and systems tests; Launch operations; spacecraft tracking - Mission operations center and associated data archival activities - CCD camera and camera associated electronics for XRT instrument - Tip/Tilt Mirror (TTM) and TTM electronics for FPP instrument image motion compensation system
United States	<ul style="list-style-type: none"> - FPP instrument (Japan - TTM) - EIS optical components & mechanisms (U.K. instrument) - XRT instrument (Japan - CCD camera) - Integration support; operations support; and mission science support
United Kingdom	EIS instrument (U.S. provided optical components); integration support; and mission science support

1.3 Scope

The RMP covers the development of the NASA provided elements and complies with NASA Policy Guide (NPG) 7120.5A. The NASA provided elements of the Solar-B mission include the following:

- the Focal Plane Package (FPP) instrument, including the United States (US) portion of the Image Motion Compensation System
- the X-Ray Telescope (XRT) instrument, with the exception of the camera and its electronics (to be provided by Japan)
- the US elements of the Extreme-ultraviolet Imaging Spectrometer
- all US developed software

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- the US provided Engineering Models
- Calibration of the US instruments
- Mission operations support

1.4 Reference Documents

Document Number	Document Title
Lockheed Martin Doc No. 2B00183	Solar-B Focal Plane Package Program, Risk Management Plan
SAO-SOLARB-DR357	Risk Management Plan for the X-ray Telescope (XRT) for Solar-B
EIS_RM_PLAN	Risk Management Plan for the SOLAR-B Mission Extreme Ultraviolet (EUV) Imaging Spectrometer (EIS) Instrument Components
NPG 7120.5	NASA Program and Project Management Processes and Requirements
MWI 7120.6	Program/Project Risk Management
MPD 1150.1 MC-08	MSFC Project Management Council

2 RISK MANAGEMENT OVERVIEW

This section provides an overview of the risk management process and its relation to the MSFC Solar-B Project Management, including primary activities, process steps, terms, and definitions. Details of the risk management process along with actions, tasks, and tools specific to the Solar-B Project, are provided in subsequent sections of this plan.

2.1 Definitions

The following terms used within this document are defined for clarity:

- (a) Threat - a concern that is perceived to have a potentially adverse impact on the achievement of program goals and objectives.
- (b) Risk Management - the identification, assessment, analysis, mitigation, and disposition of risks at each stage of the project life cycle.
- (c) Risk - a threat that has been assessed and found to have sufficient probability (qualitative or quantitative) of occurrence and/or severity of consequences such that it may have a significant impact on the program baseline. Risks should be identified at the lowest practical level and documented on Risk Summary Forms.

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(d) Risk Analysis – A process to evaluate risk probability, impact, and timeframe (when action needs to be taken); classify/group with similar/related risks; and prioritize.

(e) Fail Safe Point - a point in the abatement process where a “fallback” method or recovery plan will be enacted if the risk has not been reduced to a defined threshold.

(f) Risk Abatement - a plan developed and implemented to mitigate identified risks based on the results of risk analysis.

(g) Risk Classification:

“Green” or Low - Items are acceptable without further mitigation and shall be routinely tracked for change in status or closed.

“Yellow” or Medium - Items may require mitigation.

“Red” or High - Items considered primary risk drivers.

(h) Closed Risk - a risk item is considered closed if it satisfies any of the following criteria:

Contingency funds are available so that, should the risk item actually occur, resources would be available to recover from the cost, schedule, and technical impacts.

All reasonable abatement options have been implemented and although the risk has not been reduced to “low”, higher level management has judged the risk to be acceptable.

2.2 Primary Activities

MSFC Solar-B risk management will be conducted in accordance with NPG 7120.5A. The six primary activities of the risk management process are summarized below and discussed in more detail in the following section.

- Identification: the continuous effort to identify and document risks as they are found.

Identification is the responsibility of all Solar-B team members as well as independent reviewers. The MSFC Project Manager has overall responsibility and is specifically responsible for project level risk identification.

Each Instrument Developer is responsible for risk identification for their instrument per their specific instrument risk management plan.

Review Item Discrepancies, from technical reviews, will be utilized to identify risk.

A risk statement, documented on risk assessment form and identified by a unique number (see appendix B), is generated for each risk.

Activity data products: 1) Risk Assessment Form (Risk statement section filled in) 2) Risk summary list.

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- Analysis: an evaluation of the probability, impact, and timeframe (expected occurrence or when mitigation actions would be needed) of the risks, and classification into sets of related risks.

Risks identified in the previous activity are assessed for safety, cost, schedule, and technical performance impact.

Each risk is classified and prioritized by the Project Team.

Each risk shall be identified by number and shall have a responsible person(s) assigned as owner.

Activity data products: 1) Risk Assessment Form (risk assessment and owner added to form)

- Planning: a decision about what to do with the risks, which will include mitigation plans for important risks, including assignment of responsibilities and schedules for completion, and prioritization of risks relative to each other.

Abatement options for "high/red" risk shall be developed and analyzed.

Abatement options for "medium/yellow" risk are developed and analyzed if the Project Team has determined mitigation is required.

Once a mitigation option is selected, an abatement plan is developed for each "high/red" risk and those "medium/yellow" risks determined to need mitigation.

Each plan shall define a set of tasks/actions with a defined schedule and contain a "fail safe" point and closure criteria.

Activity data products: 1) Risk Assessment Form (Risk Abatement plan added to form)

- Tracking: an activity to capture, compile, and report risk attributes which determine whether or not risks are being mitigated effectively and risk mitigation plans are being performed correctly. For risks that do not require mitigation, tracking is necessary to maintain awareness of their current status.

Risk reviews held periodically during the month, typically at weekly meetings, at the instrument developer level.

The Solar-B Systems Engineer will regularly review the status of risk and communicate the status to the Project Manager.

Activity data products: 1) Risk assessment form (status/progress and/or action updated)

- Controlling: A risk may be closed or watched, a mitigation action may be re-planned, or a contingency plan may be invoked. Decisions on the appropriate resources needed are also determined during this activity.

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Abatement plan tasks/actions and defined schedule will be reviewed by the Solar-B Systems Engineer and/or the Project Manager at least once a month.

A fallback plan or recovery plan will be enacted if the risk has not been reduced to a defined threshold.

When they are required, replanning activities will be reviewed and approved.

A risk is closed if the abatement plan closure criteria are met.

Activity data products: Updated Risk Assessment forms, as required, (Revised risk abatement plan, new actions, risk closure, etc.)

- Documentation: actions to communicate and document the risk at all steps of the risk management process. This can be in the form of an action item, risk database entry, mitigation plan, status report, tracking log, and /or meeting decision.

Risk assessment forms, (statement, assessment, abatement plan, action items and periodic status) and all supporting data are electronically archived on the Solar-B risk management database (RMD).

2.3 Risk Management Tools

The minimum application of RM tools required for a given type of program/project is specified in MWI 7120.6, Program/Project Risk Management, according to the types defined therein. While the Solar-B Project has a low complexity and relatively short life, its costs and Civil Service manpower levels are marginally above the Project Management Council threshold defined in the MSFC Project Management Council Charter, MPD 1150.1 MC-08. This is consistent with a Type II project per MWI 7120.6. Therefore, the tools to be used by the Solar-B Project, as required by MWI 7120.6, are Failure Mode and Effects Analysis (FMEA), Fault Tree Analysis (FTA), and Hazard Analysis (HA).

3 ORGANIZATION/ ROLES AND RESPONSIBILITIES

3.1 MSFC Solar-B Project Manager

The MSFC Solar-B Project Manager has overall responsibility for Risk Management on the Solar-B Project. This includes ensuring risk management activities are conducted at the contractor site and at MSFC and establishing the disposition of Solar-B risk items.

The MSFC Project Manager will screen all Risk Summary Forms, Risk Abatement Plans, and identify risks that require elevating for Solar Terrestrial Probes (STP) Program Office and MSFC management visibility. Risks that fall outside the scope of the project or that have significant cost, schedule, and technical impacts will be presented to the STP Program Office and the Spaceflight Experiments Group management as appropriate.

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3.2 Solar-B Instrument Developers

The Solar-B development contractors serve as the focal points for compiling, controlling, and maintaining the comprehensive Risk List, Risk Summary Forms, and proposed abatement plans for their instrument. The contractors or the Project Office will prioritize, track, and report the principal risks for their instrument. For each principal risk, the contractor will develop a schedule for accomplishing mitigation, a cost impact, and contingency plan if required.

3.3 Solar-B Project Team

The MSFC Solar-B project team members (MSFC Project Office members and each instrument developer) are responsible for the following:

Assessing threats to determine if any are risks, documenting the risk on the Solar-B Risk Assessment Form (appendix B), analyzing the identified risks, and supporting the project in developing abatement options for "medium/yellow" and "high/red" risks.

Developing and maintaining a list of risks for their respective instrument.

Identifying and communicating how risks from their respective instrument might affect the Solar-B mission.

3.4 Solar-B Systems Engineer

The MSFC Solar-B Systems Engineer serves as the lead for project risk management. Throughout mission design, development and operations, the system engineer:

Works with instrument contractor teams in the identification of mission risks.

Works with the project manager, contractors and NASA discipline engineering teams to mitigate these risks.

Vigorously works with contractors and Project Team members to make trade-off decisions that mitigate risks in order to maximize the likelihood of mission success.

Regularly communicates the progress of the risk mitigation plans and tradeoffs to project, program and institutional management.

During the operational phase, assesses mission risks and behavior under actual conditions.

Ensures use of Fault Tree Analyses, where appropriate, to identify what could go wrong.

With input from contractors, maintains a formal record of risk factors to instrument objectives, in the form of a risk summary list.

Ensures design decisions driven by risk factors are recorded in the RMD.

Ensures each "yellow" and "red" risk has an associated Abatement Plan Lead, regarded as the "risk owner," who is responsible for managing that risk.

Reports risks and revised risk mitigation techniques at all major project reviews.

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4 RISK MANAGEMENT PROCESS DETAILS

The following section outlines the specific guidelines to be used by the MSFC Solar-B project team for risk management. The risk management process should follow the guidelines and procedures listed in this section.

The three Solar-B Instrument Developer teams will utilize a Risk Management process tailored for their unique situation, based on existing organizational methodologies and processes. The Instrument Developer Risk Management process is documented in the respective instrument Risk Management Plan, see section 1.4, and approved by the MSFC Solar-B Project Office.

4.1 Risk Identification

The Solar-B Instrument Developers and MSFC Project Office team shall identify risks by continually reviewing the project requirements and system-level requirements, interface documentation, system and subsystem specifications, design and development data, contractual baselines, schedules, costs and all other relevant project elements. These items will be assessed against the project baseline to ensure that the technical, cost, and schedule objectives support compliance with project requirements. Risks can be identified at any time during the project life-cycle. Risk management is a continual process and is updated as new information becomes available. Although risk management is a continuous process, mandatory review of risks shall be included in preparation for major milestones, technical reviews and audits, and concurrent with review and update of project changes and impacts.

Risk identification methods to be used may include but are not limited to:

- Hazard Analysis (HA) – A Preliminary Hazard Analysis (PHA) shall be performed as part of the Concept Definition Phase of the Project. A System Hazard Analysis (SHA) will be performed during the Design and Development Phase. The need for further HA shall be determined on the basis of the results from the PHA.
- Fault tree analysis (FTA) – When the level of design maturity is sufficient, the Solar-B Team and S&MA will conduct a systems analysis to determine what areas require Fault Tree Analyses. Any project fault tree generated will identify principal undesired, intermediate, and basic events. Component, subsystem, and system validation plans and interfaces will be key considerations determining when to stop decomposing each branch of the fault tree.
- Failure Mode and Effects Analysis (FMEA) – A FMEA for the Solar Optical Telescope Focal Plane Package (FPP) will be performed by the Instrument Developer.
- Lessons learned files from previous projects – The Solar-B Team shall review the NASA lessons learned site, <http://llis.nasa.gov/>, periodically
- Technical Reviews
- Expert interviews

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- Team meetings that focus on risk
- Individual efforts to identify risks
- Independent assessment

The following elements, while not an all-inclusive list, should be used to identify areas that need to be addressed in the risk identification process:

Technical Risk Sources

State-of-the-Art Advance

- Complexity/difficulty in meeting requirements
- Percent proven technology
- Special resources needed
- Operating environment
- Degree difference from existing technology

Physical Properties

- Thermal
- Mass
- Power
- Vibration
- Envelope

Integration/Interface Risks

- Design Maturity
- Compatibility
- Controllability
- Survivability
- Vulnerability

Software Design Risks

- Code estimates reasonable?
- Functional requirements complete?
- Test procedures complete?
- Critical modules identified?
- Hardware constraints defined?
- Code complexity required
- Code compatibility

Critical Failure Modes

- Reliability
- Maintainability

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Redundancy/Fault Tolerance
 Fault Detection
 Fault Correction

Schedule Risk Variables

Sensitivity to technical and cost risk
 Availability of materials, personnel, and test facilities
 Communication delays/errors
 Change in requirements
 Test failures

Cost Risk Variables

Sensitivity to technical and schedule risk
 Realistic cost estimates

Supportability Risk Variables

Manpower
 Facilities
 System safety
 Spares
 Lead times
 Data Management
 Funding

Risks identified shall be entered as risk statements, on Solar-B Risk Assessment form, in the Solar-B Risk Management Database. Risk statements shall be written clearly and concisely, citing only one risk condition, and one or more consequences of that condition. All other relevant information shall be captured as context describing the circumstances, contributing factors, and related issues. Good context provides the what, how, when, where, and why of the risk condition.

4.2 Risk Analysis

Risk analysis is used to ascertain as accurately as possible the likelihood of an identified risk causing detrimental effects to a program, the full consequences of such an event, and a determination as to whether abatement actions are required. If risk mitigation is not pursued, the project will continue to monitor the identified risk. The following subsections describe major areas of risk analysis and classification.

4.2.1 Risk Impacts

4.2.1.1 Cost and Schedule Impacts

Analysis will be performed to determine the impact of cost and schedule risks to the project. If cost or schedule impacts are expected to be significant, an evaluation will be performed to determine how the expected schedule slip or cost overrun will affect the program. For significant

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cost risks, Rough Order of Magnitude (ROM) estimates will be developed and for significant schedule risks critical path analysis will be provided. The Solar-B Project Manager will determine the budget source to mitigate risks that have cost impacts.

4.2.1.2 Technical Impacts

Each risk will be analyzed to determine its impact on requirements including: instrument performance, mass/power reserves, and functional and interface compatibility. Subsequent evaluation should quantify the negative impact of the risk on instrument performance, and degradation shall be assessed based upon the magnitude of the impact on the respective instrument science objectives.

4.2.1.3 Safety Impacts

The analysis of each risk shall include consideration of the potential for loss of life, personnel injury, equipment or property damage or loss, and mission or test failures. In compliance with NPG 7120.5, any risk for which the impact may be death, severe injury, or major property damage shall be documented, tracked, and disposed as described in this document and in NPG 7120.5.

4.2.2 Risk Classification

Risks shall be classified using the Impact, Likelihood, and Timeframe classifications defined below. Impact classifications are based on Project requirements, mission success criteria, resources, and cost and schedule constraints. Likelihood classifications are intended to provide an order of magnitude estimate based on available quantitative data and qualitative experience. The classification of risks, under the guidelines described below, will be performed by a Risk Classification Panel, which will be chaired by the Solar-B Systems Engineer. The panel comprises, in addition to the Systems Engineer, the Solar-B Project Manager, the Solar-B Instruments Manager, the Solar-B Project Scientist, an S&MA representative, and others as deemed necessary by the Solar-B Systems Engineer. The Risk Assessment Panel shall convene at the discretion of the Solar-B Systems Engineer, but at least monthly.

4.2.2.1 Impact Classification

- Unacceptable (5)

Schedule Slip - Slip in delivery of the proto-model, major system or subsystem > 3 months

Cost Overrun - >20% increase to Contractor cost

Technical - Loss of mission or critical function

- Major (4)

Schedule Slip - > 1 month <3 month delay of deliverables

Cost Overrun - >10% but <20% increase to Contractor cost

Technical - Inability to meet power, weight, size, and/or performance requirements

- Medium (3)

Schedule Slip - > 2 week <1 month delay of deliverables

Cost Overrun - >5 % but <10% increase to Contractor cost

Technical - Loss of design margins

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- Minor (2)

Schedule Slip - <2 week delay of deliverables, potential to recover schedule

Cost Overrun - minor impact, potential to recover cost

Technical - small impact to design margins

- Minimal (1)

Schedule Slip - <1 week delay of deliverables, potential to recover schedule

Cost Overrun - minimal impact, potential to recover cost

Technical - minimal impact to design margins

4.2.2.2 Likelihood Classification (prior to mitigation)

- Very High Probability of Occurrence (5)

Cannot prevent occurrence.

- High Probability of Occurrence (4)

Occurrence is very likely

- Medium Probability of Occurrence (3)

Occurrence is likely

- Low probability of occurrence (2)

Occurrence is a potential

- Very Low Probability of Occurrence (1)

Occurrence is very unlikely

4.2.2.3 Timeframe and Exposure Grade Classification

Each RMD mitigation entry shall have a completion date listed in the abatement plan. This date or combination of dates shall serve as the time-frame classification.

Once risk items are entered and classified in RMD, the risk will be assigned an exposure grade (Red/Yellow/Green) based on the following combinations of the consequence and likelihood. "Stoplight Status Charts" using this definition for red, yellow, and green status will be one of the tools used for reporting purposes. The exposure grade is also expressed numerically as the product of the likelihood and the impact classifications. This number is used for tracking and reporting purposes.

4.2.3 Risk Prioritization

Items classified as Green are acceptable without further mitigation and shall be routinely tracked for change in status or closed.

Items classified as Yellow may require mitigation. For these items, alternative dispositions may be identified and/or trade studies conducted to determine the mitigation required. Future decision milestones will be identified to enable effective tracking of those risks for which immediate action is deemed not necessary.

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Items classified as Red are considered primary risk drivers. For these items, risk abatement plans will be developed. Red risks will be assessed for impact to budget reserves, and will be tracked to closure.

Time-frame is used in conjunction with the Risk Classification Chart, as defined in Figure 1, to determine priorities, establish when risks need to have actions taken, and determine how long risks may need to be watched or tracked before they no longer are a concern or can be closed.

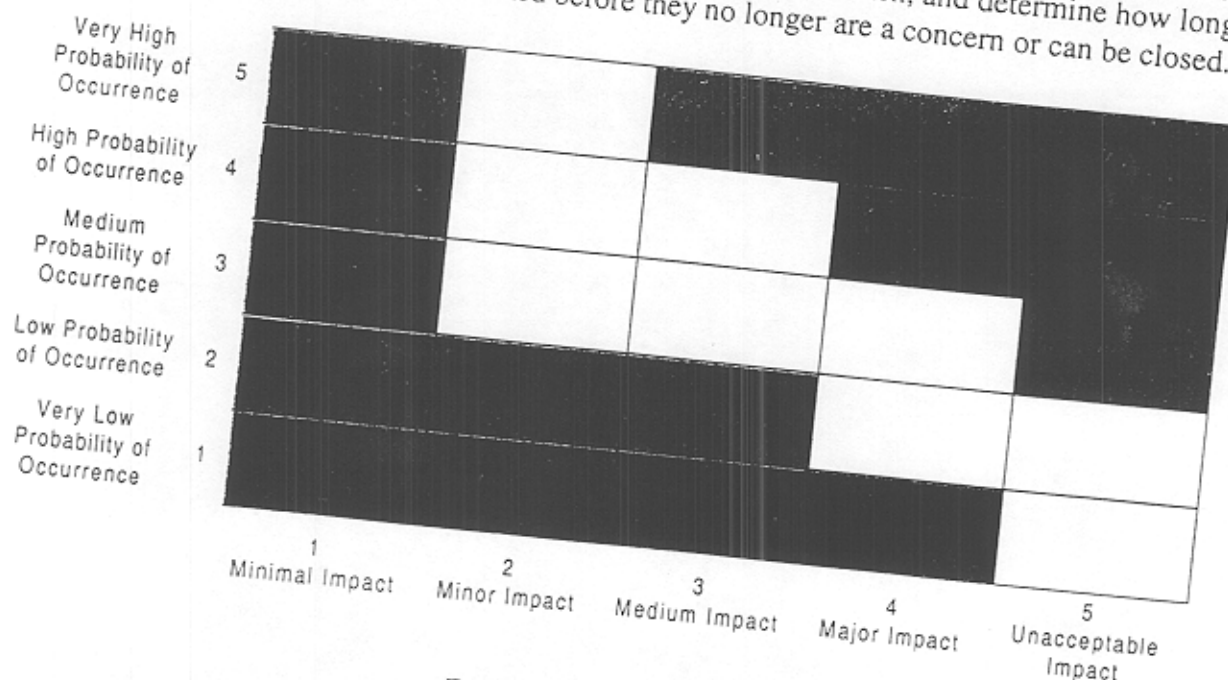


Figure 1. Risk Classification Chart

4.3 Risk Abatement Planning

Once a risk has been identified and the probability and consequences assessed, the project will develop an abatement plan for all "red" and those "yellow" determined to need mitigation.

Abatement actions usually fall within the following areas:

1. Schedule alterations: Develop work arounds to remove the item from the critical path, apply more resources to the activity to reduce its expected duration, or assign schedule reserve, if feasible, to the item at risk.
2. Cost management: Redirect money from other areas of the project or allocate reserve funds if possible.
3. Technical performance: Investigate the availability of an off-the-shelf item, add tests to monitor progress, evaluate alternate sources, relax requirements, seek help from experts in related technical disciplines.

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4. Acceptance: Accept the risk as-is. Higher level management approval is required to accept risks in the "high" category.

Each individual risk item will lend itself to specific abatement activities. It is the responsibility of the Solar-B Instrument Developers to generate viable abatement actions.

The next three sections describe the steps of risk abatement in order.

4.3.1 Identify Abatement Options

The Solar-B Instrument Developers will develop abatement options per the processes described in their respective Risk Management Plans. The Solar-B Project team will assist the Solar-B Project Manager in developing specific abatement options for individual risks generated at the Project Office level. The Project Manager will approve the abatement actions to be taken. It is important that all areas of program risk (cost, schedule, and technical) be considered in the generation of abatement options. After a sufficient number of options have been generated the project team will analyze and assess each option. The project will perform an initial "screening" to remove from consideration any options that are not feasible.

4.3.2 Assess Abatement Options

Each abatement option will be analyzed to ensure that other risks are not induced or worsened by the solution. Following this assessment, the most effective course of action will be chosen. Each option must be reviewed to address program-wide impacts. Impacts to the following areas must be identified:

1. Schedule: The amount of time the abatement plan will take to implement, the impact on the critical paths, and a determination if sufficient resources exist to support the plan.
2. Costs: Non-recurring and life-cycle costs.
3. Technical: System performance, reliability/maintainability, operations, safety, etc.
4. Safety: hazards which might cause mission failure or loss of the spacecraft system availability.

From the abatement options identified, the appropriate abatement strategy will be selected by the Solar-B Project team and appropriate Instrument Developer.

4.3.3 Implementation Strategy

Once an appropriate abatement option has been chosen the project will develop an abatement plan. This plan includes the technical tasks involved; the required cost deltas for implementing the plan, the schedule impacts; and the manpower and other resources required to implement the

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plan. The Solar-B Risk Assessment Form, Appendix B, will be utilized for the collection of the required risk information. The Abatement Plan will identify all steps required to close the risk item. The plan will have the following characteristics as a minimum:

1. Each plan shall define a set of tasks/actions with a defined schedule.
2. Status of identified risks and abatement plans will be reported at team meetings and presented at management reviews.
3. The plan will contain a "fail safe" point. This will be a point in the plan where a "fallback" method or recovery plan will be enacted if the risk has not been reduced to a defined threshold.
4. The plan will contain an end point including closure criteria. An end point is a point in the program that can be defined such as when a hardware item is qualified or drawings are back on schedule.

Risks may be identified which fall outside the immediate scope of the Solar-B project, or which are sufficiently significant to require higher-level management attention and direction. When such a risks are identified, higher-level management will be notified, and options for abatement presented. Examples of these types of risks include: risks requiring additional funding, schedule delays to on-dock delivery, or not meeting significant user requirements.

5 PROJECT RISK REPORTING

This section describes how the risk information will be tracked, controlled and documented.

Status of the project risk management activities shall be reported as follows:

- The Solar-B Systems Engineer regularly reviews the status of risk and communicates the progress of the risk mitigation to the Project Manager.
- Weekly Instrument Developers team meetings shall include risk status, as applicable.
- The status of each Instrument Developer's "red and yellow" risks shall be summarized and reported to the Project Manager on a monthly basis.
- Major Project and Program meetings shall include risk status using Stoplight Charts, as required.
- Monthly reports to the STP Program Office shall include status of the principal risk items.

All Solar-B risk management products and action items will be documented and tracked by the Solar-B Instrument Developers and/or the MSFC Solar-B Project Office. All risk information

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shall be documented in the RMD. The following reports, forms, spreadsheets, and templates will be developed and used during the execution of the Project Risk Management process:

- RMD
- Risk Assessment Form
- Risk Action Item Spreadsheets
- Master Risk Summary Matrix
- Stoplight Status Charts

Once a risk has been assigned to a team member, that person will be responsible for monitoring the risk and updating the risk information.

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APPENDIX A

Acronyms

Solar-B	Solar-B
NHB	NASA Handbook
NPG	NASA Policy Guideline
RMD	Risk Management Database
RMP	Risk Management Plan
ROM	Rough Order of Magnitude
S & MA	Safety and Mission Assurance
STP	Solar Terrestrial Probes

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Appendix B
Solar-B Risk Assessment Form

Report Date _____

Risk #	Title
Instrument	Subsystem
<u>Risk Statement</u> (Narrative)	
Date Identified: _____ Originator: _____ Phone: _____	
<u>Initial Risk Assessment</u>	
Likelihood: (1=low, 5 unacceptable) Impact: (1=minimal, 5 = unacceptable) Initial Exposure: (Likelihood) x (Impact) Risk Area: (Safety = S, Technical = T, Cost =C, Schedule = SH) Assessment Lead: Status:	
<u>Impact/Consequence</u> (Narrative)	
<u>Abatement Plan</u> (Narrative, Actions, Schedule, etc.)	
Lead:	
<u>Historical Events/ Status</u> (Narrative)	
<u>Risk Closure</u>	
Expected Closure:	Fail Safe Point: (i.e.PDR, CDR, etc.)
Closure Date:	Authorization
<u>Closure Rational/ Verification</u> (Narrative)	

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DOCUMENT INPUT RECORD

I. TO BE COMPLETED UPON SUBMITTAL OF DATA

1. APPROVED PROJECT: SOLAR-B	2. DOCUMENT/ DRAWING NO.: SOLAR-B-PLAN-2006	3. CONTROL NUMBER: N/A	4. DOCUMENT RELEASE DATE: 10/19/2000	5. SUBMITTAL DATE: 10/19/00
6. DOCUMENT/DRAWING TITLE: Risk Management Plan			7. REPORT TYPE: PLAN	
8. CONTRACT NO./PERFORMING ACTIVITY: 784-11-10		9. DRD NUMBER:		10. DPD / DRL / IDRO NUMBER:
11. DISPOSITION AUTHORITY (official records only):		12. SUBMITTAL AUTHORITY:		13. RELEASING AUTHORITY: SD21/Larry Hill Solar-B Project Manager
14. SPECIAL INSTRUCTIONS: Please Print in Color due to block diagram on page 16 Distribute per attached List.-- Return Original to ED43/PWI/Laura Giardini				
15. CONTRACTOR/SUBMITTING ORGANIZATION, ADDRESS AND PHONE NUMBER:			16. ORIGINATING NASA CENTER: MSFC	
			17. OFFICE OF PRIMARY RESPONSIBILITY: SD21	
18. KEYWORDS:			19. NUMBER OF PAGES: 22 ^{cb}	20. SECURITY CLASSIFICATION OF REPORT: UNCL

II. TO BE COMPLETED FOR ENGINEERING DRAWINGS

21. REVISION:	22. ENG. ORDER:	23. PARTS LIST:	24. CCBD:
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III. TO BE COMPLETED FOR REPORTS, SPECIFICATIONS, ETC.

25. REVISION: Rev. A	26. CHANGE:	27. VOLUME:	28. BOOK:	29. PART:	30. SECTION:
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V. ORIGINATING ORGANIZATION APPROVAL

41. NAME: Larry Hill	42. SIGNATURE: <i>L.D. Hill</i>	43. ORG. CODE: SD21	44. PHONE NUMBER: (256) 544-5046	45. DATE: 10/19/2000
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VI. TO BE COMPLETED BY MSFC DOCUMENTATION REPOSITORY

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